CLAIMS

We claim:

1. A polynucleotide which specifically binds to a target nucleic acid molecule and circularizes around said target, wherein said polynucleotide comprises:

a target binding sequence which is at least partially complementary and capable of binding to a sequence of the target; and

a catalytic domain which is capable of catalytic activity, wherein said catalytic activity is inhibited in the absence of binding of the polynucleotide to the target.

- 2. A polynucleotide according to claim 1, wherein said catalytic activity catalyzes said circularization of the polynucleotide around the target
- 3. A polynucleotide according to claim 2, wherein said catalytic activity is a ligase activity.
- 4. A polynucleotide according to claim 3, wherein said ligase activity comprises ligation of 5' and 3' ends of said polynucleotide to topologically link the polynucleotide to the target.
- 5. A polynucleotide according to claim 3, wherein said ligase activity comprises ligation of the 5' end of said polynucleotide to the 2' hydroxyl group of an internal nucleotide of said polynucleotide.
- 6. A polynucleotide according to claim 3, wherein said catalytic domain is the catalytic domain of a hairpin ribozyme.
- 7. A polynucleotide according to claim 1, wherein said catalytic domain comprises ribonucleotide residues or analogs thereof.
- 8. A polynucleotide according to claim 1, wherein said catalytic domain comprises deoxyribonucleotide residues or analogs thereof.

9. A polynucleotide according to claim 1, wherein said catalytic domain comprises both ribonucleotide and deoxyribonucleotide residues, or analogs thereof.

- 10. A polynucleotide according to claim 1, wherein the inhibition of said catalytic activity is effected by a regulatory nucleic acid sequence which binds to at least a portion of the target binding sequence, thereby preventing said circularization when the target binding sequence is not bound to the target.
 - 11. A polynucleotide according to claim 1, wherein said target comprises RNA.
 - 12. A polynucleotide according to claim 1, wherein said target comprises DNA.
- 13. A polynucleotide according to claim 1, wherein said polynucleotide is prepared synthetically.
- 14. A polynucleotide according to claim 1, wherein said polynucleotide is prepared by expression from an expression vector.
- 15. A polynucleotide according to claim 14, wherein said expression occurs in vitro.
- 16. A polynucleotide according to claim 14, wherein said expression occurs *in vivo*.
- 17. A polynculeotide according to claim 16, wherein said polynucleotide is expressed by RNA polymerase II or III in the nucleus of a host cell.
- 18. A complex comprising a polynucleotide according to claim 1 circularized around said target molecule.
- 19. A method for circularizing a polynucleotide around a target nucleic acid molecule, said method comprising contacting said target molecule with a polynucleotide according to claim 1, wherein binding of said target binding sequence to said target prevents inhibition of said catalytic activity, thereby allowing circularization to proceed..

20. A method for reducing efficiency of transcription, comprising topologically linking a polynucleotide to a target according to the method of claim 19, wherein said topological linkage reduces efficiency of transcription from the target.

- 21. A method for reducing efficiency of translation, comprising topologically linking a polynucleotide to a target according to the method of claim 19, wherein said topological linkage reduces efficiency of translation from the target.
- 22. A method for detecting presence or absence of a target nucleic acid molecule, said method comprising contacting a composition suspected of containing said target with a polynucleotide according to claim 1 and detecting circularization of the polynucleotide around the target, wherein presence of said circularization indicates presence of the target in the composition, if any.
- 23. A method according to claim 22, wherein said target is linked to a solid support.
- 24. A method according to claim 23, wherein said solid support is a hybridization membrane.
- 25. A method according to claim 22, wherein said polynucleotide is comprised within an array.
- 26. A method according to claim 22, wherein said detection comprises amplification of the circularized polynucleotide.
- 27. A method according to claim 26, where said amplification comprises rolling circle amplification.
- 28. A method according to claim 22, wherein said polynucleotide comprises a detectable label and said detection comprises detection of the label bound to the target.

29. A method according to claim 28, wherein said label is selected from the group consisting of radioactive, fluorescent, hapten, or enzymatic labels, or a member of a binding pair.

- 30. A library comprising a plurality of polynucleotides, wherein each of said polynucleotides comprises a target binding sequence, a catalytic domain which is capable of catalytic activity, and a regulatory sequence which inhibits catalytic activity in the absence of binding between the target binding sequence and a nucleic acid target, and wherein at least one of the target binding sequence, the catalytic domain, and the regulatory sequence is at least partially randomized.
- 31. A method for selection of polynucleotides that are capable of topologically linking to a target nucleic acid molecule, comprising contacting said target with a plurality of polynucleotides from a library according to claim 30, and amplifying the polynucleotides which become topologically linked to the target.
 - 32. A kit comprising a polynucleotide according to claim 1.
 - 33. A kit comprising a library according to claim 30.